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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/769,252

01/30/2004

David Keller

200207762

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05/16/2006

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

FIDLER, SHELBY LEE

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/769,252	KELLER ET AL.	
	Examiner	Art Unit	
	Shelby Fidler	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,5,13,14,16,24,26,37,38 and 40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,6-9,11,12,15,17-19,20,22,23,27-31,36,39,41-43 and 45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/30/04 & 6/3/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claims 2, 3, 5, 13, 14, 16, 24, 26, 37, 38, and 40 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 4/17/2006.

Claim Objections

Claim 37 objected to because of the following: the claim contains a typographical error indicating that the claim is dependent from itself.

Claims 39 and 41-45 are objected to because of the following: these claims are dependent from claim 37, which is dependent from itself. For the purpose of this rejection, Examiner assumes that each of claims 37, 39, and 41-45 are dependent upon claim 36. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claims 1, 4, 8, 9, 11, 12, 15, 19, 20, 22, 23, 29, 31, 36, 39, 41, 42, 43, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Tachihara et al. (US 6447088 B2).

Tachihara et al. teach the following:

***regarding claims 1 and 12, a fluid ejection device comprising:**

a die including a plurality of nozzles (col. 7, lines 32-36) variously configured according to a predetermined intended distribution (discharging ports 511-514 are configured according to the distribution shown in Fig. 8); and

a controller (inherent to controlling the discharging of ink as in col. 2, lines 54-57) configured to set a mean drop volume provided by the plurality of nozzles by selectively firing selected nozzles (col. 2, lines 54-57)

***regarding claims 4, 15, and 39, the predetermined intended distribution is based on a normal distribution of nozzle sizes (col. 1, line 64 – col. 2, line 4 of the background, compared to Fig. 1 shows that the nozzle distribution is normal)**

***regarding claims 8 and 19, the controller is configured to set the mean drop volume of the die by selectively firing a subset of commonly sized nozzles (col. 4, lines 16-18)**

***regarding claims 9 and 20, the plurality of nozzles are arranged on the die so that large nozzles are intermixed with small nozzles (e.g. Fig. 8 shows large discharge ports 511 intermixed with small discharge ports 514)**

***regarding claims 11 and 22, the plurality of nozzles are arranged to avoid visually perceptible artifacts (col. 2, lines 22-24 show that high-quality recording is produced, which is known to avoid visually perceptible artifacts)**

***regarding claim 23, a fluid ejection device comprising:**

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a die including a plurality of nozzles (col. 7, lines 32-36) configured with various intended sizes (col. 7, lines 11-13), wherein the intended size of each nozzle is selected according to a predetermined intended distribution that defines at least a boundary interval of intended nozzle sizes (boundary interval is 13 μ m-22 μ m, col. 7, lines 11-13) and a probability distribution of intended nozzle sizes (the probability distribution as shown in Fig. 8); and

a control system (inherent to controlling the discharge of ink as in col. 2, lines 54-57) configured to set a mean drop volume of the die by selectively firing selected nozzles of the die (col. 2, lines 54-57)

***regarding claim 29**, the control system is configured to set the mean drop volume of the die by selectively firing nozzles in a subinterval of intended nozzle sizes (col. 6, lines 36-41)

***regarding claim 31**, a fluid ejection device comprising:

a die including a plurality of nozzles (col. 7, lines 32-36) configured to eject printing fluid (col. 7, lines 8-10), wherein an intended drop volume of printing fluid ejected from each nozzle is derived from a predetermined intended distribution (col. 7, lines 16-19); and

a control system (inherent to controlling the discharge of ink as in col. 2, lines 54-57) configured to set a mean drop volume of the die by selectively firing selected nozzles of the die (col. 2, lines 54-57)

***regarding claim 36**, a printhead die comprising:

a first group of nozzles having a first nozzle size (e.g. discharging ports 511, Fig. 8); and

a second group of nozzles having a second nozzle size different than the first nozzle size (e.g. discharging ports 512, Fig. 8);

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wherein a number of the first group of nozzles and the second group of nozzles are determined according to a predetermined intended distribution (the number of micrometers in size is shown in col. 7, lines 11-13)

***regarding claim 41**, a third group of nozzles having a third nozzle size different than both the first and second nozzle size (discharging ports 513, Fig. 8) and wherein a number of the third group of nozzles is determined according to the predetermined intended distribution (the number of micrometers in size is shown in col. 7, lines 11-13)

***regarding claim 42**, a location of each of the first group of nozzles and each of the second group of nozzles is determine based upon the predetermined intended distribution (col. 7, lines 11-19 show the different nozzle sizes and Fig. 8 shows the nozzle location distribution)

***regarding claim 43**, the first group of nozzles and the second group of nozzles are intermixed in location (Fig. 8)

***regarding claim 45**, the location of the first group of nozzles and the second group of nozzles are arranged to avoid visually perceptible printing artifacts (col. 2, lines 22-24 show that high-quality recording is produced, which is known to avoid visually perceptible artifacts; therefore, the nozzle groups must be located as such)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 6, 7, 17, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachihara et al. (US 6447088 B2) in view of Rezanka (US 5412410).

Tachihara et al. teach the following:

***regarding claims 6 and 17**, a subset of the nozzles are sized larger than others of the plurality of nozzles (e.g. discharging ports 511, Fig. 8)

***regarding claims 7 and 18**, a subset of the nozzles are sized smaller than other of the plurality of nozzles (e.g. discharging ports 514, Fig. 8)

***regarding claim 27**, the boundary interval includes a subinterval of large intended nozzle sizes (large nozzles are sized 22 μ m, col. 7, lines 11-13)

***regarding claim 28**, the boundary interval includes a subinterval of small intended nozzle sizes (small nozzles are sized 13 μ m, col. 7, lines 11-13)

Tachihara et al. does not expressly teach the following:

***regarding claims 6 and 17**, the controller sets the mean drop volume to a low mean drop volume by selectively firing nozzles of the subset

***regarding claims 7 and 18**, the controller sets the mean drop volume to a high mean drop volume by selectively firing nozzles of the subset

***regarding claim 27**, the control system sets the mean drop volume to a low mean drop volume by selectively firing nozzles sized in the subinterval of large intended nozzle sizes

***regarding claim 28**, the control system sets the mean drop volume to a high mean drop volume by selectively firing nozzles sized in the subinterval of small intended nozzle sizes

Rezanka teaches the following:

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***regarding claim 6**, the controller sets the mean drop volume to a low mean drop volume by selectively firing nozzles of the subset (col. 3, lines 25-28 shows that in high resolution printing - low volume printing - both nozzle groups are used; therefore, nozzles from the subset are used)

***regarding claim 7**, the controller sets the mean drop volume to a high mean drop volume by selectively firing nozzles of the subset (col. 3, lines 23-25 shows that in contone printing - high volume printing - nozzles from different groups are used; therefore, nozzles from the subset are used)

***regarding claim 27**, the control system sets the mean drop volume to a low mean drop volume by selectively firing nozzles sized in the subinterval of large intended nozzle sizes (col. 3, lines 25-28 shows that in high resolution printing - low volume printing - both nozzle groups are used; therefore, nozzles from the subinterval of large intended nozzles are used)

***regarding claim 28**, the control system sets the mean drop volume to a high mean drop volume by selectively firing nozzles sized in the subinterval of small intended nozzle sizes (col. 3, lines 23-25 shows that in contone printing - high volume printing - nozzles from different groups are used; therefore, nozzles from subinterval of small intended nozzles are used)

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize low mean drop volume printing by selectively firing nozzles of a subset. The motivation for doing so, as taught by Wen (US 6241333 B1), is to make a single droplet compatible with the pixel size (col. 2, lines 7-9).

Claims 10, 21, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachihara et al. (US 6447088 B2) in view of Yuan et al. (US 5609919).

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Tachihara et al. teach the following:

***regarding claims 10 and 21**, the plurality of nozzles are arranged on the die
(discharging ports t and t' arranged on nozzle member 4, Figs. 1A and 1B)

***regarding claim 44**, the location of the first group of nozzles and the second group of nozzles are arranged to be intermixed (Fig. 8 shows that discharging ports 511 and 512 are intermixed)

Tachihara et al. do not expressly teach the following:

***regarding claims 10 and 21**, large nozzles are pseudorandomly intermixed with small nozzles

***regarding claim 44**, the nozzles are pseudorandomly intermixed

Yuan et al. teach the following:

***regarding claims 10 and 21**, large nozzles are pseudorandomly intermixed with small nozzles (Fig. 2F)

***regarding claim 44**, the nozzles are pseudorandomly intermixed (Fig. 2F)

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize large nozzles pseudorandomly intermixed with small nozzles into Tachihara et al.'s invention. The motivation for doing so, as taught by Yuan et al., is to allow variably sized droplets to be produced with a tailored size and flux distribution (col. 6, lines 49-52).

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tachihara et al. (US 6447088 B2) in view of Raman et al. (US 6655775 B1).

Tachihara et al. teach all claimed limitations except for the following:

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***regarding claims 25, the predetermined intended distribution defines a normal probability distribution of intended nozzle sizes**

Raman et al. teach the following:

***regarding claims 25, the predetermined intended distribution defines a normal probability distribution of intended nozzle sizes (col. 2, lines 50-58 read with Fig. 1 shows that the distribution is a normal probability distribution of nozzle drop weight; col. 5, lines 47-51 show that drop weight is related to nozzle sizes)**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize a distribution that defines a normal probability of intended nozzle sizes in Tachihara et al.'s invention. The motivation for doing so, as taught by Raman et al., is to form the printhead in high volume and to have a manufacturing tolerance (col. 2, lines 52-58).

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Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelby Fidler whose telephone number is (571) 272-8455. The examiner can normally be reached on MWF 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

5/10/06

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SLF

K. J. FEGGINS 5/10/06
K. J. FEGGINS
PRIMARY EXAMINER